



## Technology:

- Bluetooth HSP/ HFP
- Bluetooth, MOST protocol, IBUS Technologies

## Tools used for Bluetooth development:

- Bluetooth Sniffer (FTS4BT, Merlin)
- MOST optolyzer
- TCU console
- Blue PiraT Compact data logger

## Test Processes:

- Quarterly activities
- Identification of mobile phones to be tested
- Shipping of mobile phones, test benches and firmware
- Preparation of test plan and schedules
- Defect logging, trace generation, detailed analysis and documentation
- Test results, defects, trace analysis and mobile phone recommendations review
- Use of Risk Index tool to decide severity of defect based on occurrence, frequency, impact and workaround

## The Client

BMW is a German company having revenue of over 47 million Euro. BMW is a worldwide manufacturer of high-performance and premium automobiles and motorcycles.

## The Contribution

This project involves compatibility testing of various Bluetooth mobile phones with hands-free units of car kits using Base Station simulator for GSM network simulation. The Bluetooth enabled car control unit supports standard cell phone features like call control, LCD, phone book, messaging etc.

- Executing set of test cases called as Bluetooth Compatibility Check (BTCC) with **root cause analysis** of defects and fix suggestions
- Defect reporting in Quality Centre of BMW and phone manufacturer
- Defect reporting for **communication matrix release**
- Recommending compatible phones to BMW
- Quick checks for backward compatibility of phones
- Test Planning, test execution and defect reporting and test report generation
- **81,600 tests** executed with just **2 defect leaks**
- **80 phones** tested with **6 different test benches**
- **10 phones rejected**
- Successful coding and flashing of head unit and control unit of BMW car kit using BMW's proprietary tool
- Pro-actively suggested **7 additions/modifications** in test cases which have been accepted by BMW resulting in a new version of BTCC





### Technology:

- Mono HS/ Ultimate headset
- AVRCP, A2DP, HFP
- HCI, LM, BB
- SBC Audio Codec at 44.1 KHz
- MP3 codec integration
- USB 2.0, I2S, SPI, and UART interfaces
- Noise and latency reduction algorithms
- PTS, BQB qualification support

### Tools used:

- BT Sniffer (FTS, Merlin)
- Jeeni JTAG debugger
- Anritsu BT Tester for RF power
- M-Audio for audio quality
- Spectrum Analyzer
- BTE Insight

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## The Client

Broadcom is one of the world's largest fabless semiconductor companies, with 2007 revenue of \$3.78 billion, and holds over 2,600 U.S and 1,200 foreign patents, more than 7,450 additional pending patent applications, and one of the broadest intellectual property portfolios addressing both wired and wireless transmission of voice, video, data and multimedia.

## Contribution in Bluetooth for Windows Testing

Aftek is a part of the Product Quality assurance (PQA) team for testing Bluetooth release candidate software and firmware, in combination with customer specific hardware configurations. Device under test is a Bluetooth 2.0 USB-UHE device.

Bluetooth software along with Bluetooth dongle helps to interact with remote Bluetooth devices. The software provides user friendly interface to connect and transfer data over Bluetooth link. Using this software user can connect to remote Bluetooth Keyboard, Bluetooth Mouse, Bluetooth headset, Bluetooth Printer, Bluetooth enabled mobile phone and PDA.

- **System Integration Testing:** Involves integration of all component and making sure that there is no conflict in the functionality of each Bluetooth profile
- **Compatibility Testing:** Covered testing with all supported operating systems
- **Interoperability Testing:** Covered the testing with different kinds of Bluetooth devices(keyboard, mouse, mobile phone, headsets, printer, etc) from different manufacturers (like Microsoft, Logitech, Jabra, HP, etc) and making sure that data transfer happens seamlessly without any degradation of quality and throughput
- **Localization Testing:** UI testing on different languages to make sure that text is displayed correctly on all supported languages
- **Stress Testing:** Done using automated tool. We wrote scripts to perform specific action and those are repeated many times
- **Throughput Testing:** In this testing time required to for data transfer is measured for different profiles. This works are benchmark for transfer time for next release of the software
- **Help File Testing:** Testing the static content of help file and making sure that help provided is useful for end user
- Also **recommend the new Bluetooth device to be purchased to** test interoperability with Bluetooth software

## Contribution in Headset System Testing

Aftek has been carrying out testing for **15+ Mono/Stereo headset applications** based on three generation chipsets to execute **5000+ test cases per cycle.**

- Sanity, functional, performance testing
- Interoperability testing with almost **40 phones** for each project
- **Audio Quality** measurements
- Developed **automation testing environment**
- Designing test cases, enhancing/creating test plan
- Defect reporting/tracking after manual as well automated testing
- **1200+ scripts** to cover **23 profiles** and **7 protocols** for Windows based stack